A New Andean Species of *Augochloropsis* From Peru (Hymenoptera: Halictidae)

by

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ABSTRACT

A new high-elevation species of the augochlorine bee genus *Augochloropsis* Cockerell (Anthophila: Apoidea: Halictidae: Halictinae: Augochlorini) is described and figured. *Augochloropsis* (*Paraugochloropsis*) *isabelae*, new species, is distinguished from its congeners and it is noted that females of the species exhibit head size variation. The variation in head size and morphology seen between females is suggestive of social behavior in this species. Where known, species of *Augochloropsis* range from solitary to semisocial, and there is even a single record of primitive eusociality in the genus.

Key Words: *Augochloropsis*, Peru, Halictidae, social behavior

INTRODUCTION

The bee genus *Augochloropsis* Cockerell is the most diverse of the New World halictine tribe Augochlorini, presently with 140 nominal species (Engel 2000). Only a small portion of this diversity, however, has been studied biologically. Michener & Lange (1959) studied the nesting and social behavior, or lack thereof, for five species – *Augochloropsis* (*Paraugochloropsis*) *cleopatra* (Schrottky), *A.* (*Augochloropsis*) *brachycephala* Moure [as *A. diversipennis* (Lepeletier de Saint Fargeau): *vide* Moure & Hurd 1987], *A.* (*P.*) *sumptuosa* (Smith) [as *A. humeralis* (Patton): *vide* Moure & Hurd 1987], *A.* (*A.*) *ignita* (Smith), *A.* (*P.*) *iris* (Schrottky), and *A. rufisetis* (Vachal) – while Gimenes *et al.* (1991) added a brief study of *A.* (*A.*) *notophos* (Vachal). The result of this work was that species ranged from solitary to semisocial, although *A. ignita* was suspected to possibly be primitively eusocial. *Augochloropsis iris* (Schrottky), originally believed to be solitary or semisocial by Michener & Lange (1959), was subsequently found to be primitively eusocial by Coelho

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(2002), representing the only record of this behavioral suite in the subgenus *Paraugochloropsis*. Together, *A. iris* and *A. ignita* represent independent origins of such social complexity, relative to the more intensely studied eusocial species of *Megalopta*, *Augochlorella*, *Pereirapis*, and *Augochlora* (*Oxystoglossella*). Indeed, primitive eusociality is likely much more widespread among the Augochlorini than is presently documented.

Herein I describe a new species of *Augochloropsis* from the Andes of Peru. The new species exhibits female head size variation indicative of social behavior, particularly among primitively eusocial species. I bring the species to the attention of melittologists such that its nests might be sought and further information on its biology ascertained. Morphological terminology follows that of Engel (2000, 2001) while the format for the description follows that employed elsewhere for augochlorine bees (*e.g.*, Engel 1995, 1999, 2007; Engel & Brooks 1998; Engel *et al.* 2006). Metrics are those of the holotype, with the corresponding measure in the paratype indicated in parentheses.

SYSTEMATICS

Tribe Augochlorini Beebe

Genus *Augochloropsis* Cockerell

Subgenus *Paraugochloropsis* Schrottky

Augochloropsis (Paraugochloropsis) isabelae new species

(Figs. 1–5)

Diagnosis. The new species can be recognized by the combination of a metallic green head and mesosoma paired with a metallic golden metasoma (Figs. 1–2), the coarsely and contiguous punctures of the mesepisternum and upper metepisternum, the mesoscutum with contiguous punctures becoming separated posteriorly by more than a puncture width, and the sculpturing of the propodeum and metasoma (as described below). The presence of head size variation is indicative of social behavior and female-female dominance interactions.

Description. ♀: Total length 12.74 mm (10.83 mm); forewing length 7.83 mm (7.50 mm). Head wider than long [medial length (to apex of clypeus) 3.29 mm (2.67 mm), maximal width 3.75 mm (2.96 mm)]. Compound eye length 1.79 mm (1.67 mm), maximal width 0.83 mm (0.83 mm); upper

Figs. 1–2. Photomicrographs of *Augochloropsis* (*Paraugochloropsis*) *isabelae*. 1, Lateral aspect of female (macrocephalic) holotype. 2, Lateral aspect of female paratype. [images not to same scale]

interorbital distance 2.50 mm (1.92 mm), lower interorbital distance 2.71 mm (2.0 mm). Gena swollen, much larger than compound eye width (in paratype gena is as wide as compound eye), maximal width 1.25 mm (0.83 mm). Intertegular distance 2.29 mm (2.17 mm). Mandible elongate, length greater than compound eye in holotype, simple (shorter than compound eye and with a distinct subapical tooth in paratype), length 2.04 mm (1.33 mm) (Figs. 1–2, 4–5). Wing venation as seen in Fig. 2. Apex of labral distal process truncate (not truncate in paratype), medial swelling of basal area relatively low with exceedingly faint medial depression (medial swelling and depression more distinct in paratype).

Clypeus and supraclypeal area faintly imbricate, with small, shallow punctures separated by 1–2 times a puncture width, those on supraclypeal area slightly more well defined. Integument of face below tangent of antennal toruli with sculpturing bordering subantennal sulcus like that of supraclypeal area, otherwise with more coarse, slightly larger, contiguous punctures, integument between (where evident) imbricate; integument above tangent of antennal toruli with punctures small, well defined, contiguous or nearly so. Vertex with punctures minute and more sparse, separated by 2–4 times a puncture width, integument faintly imbricate (in paratype punctures are slightly larger and more closely spaced separated by 0.5–1 times a puncture width). Gena and postgena sculptured as on vertex. Mesoscutum with well defined, contiguous punctures except bordering medial line punctures separated by less than puncture width and posteriorly along border with mesoscutellum punctures weaker, more shallow, and separated by 1–2 times a puncture width, integument between punctures faintly imbricate. Tegula faintly imbricate except posteriorly on angled portion imbricate with a few shallow punctures. Mesoscutellum and metanotum sculptured like that of posterior border of mesoscutum. Mesepisternum coarsely and contiguously punctured. Upper three-fifths of Metepisternum sculptured like that of mesepisternum, next lower fifth with punctures smaller, well defined, and separated by less than a puncture width, basal fifth imbricate and impunctate. Basal area of propodeum imbricate with irregularly roughened area not reaching posterior border (in macrocephalic female roughened area has slightly more well defined rugosities than in paratype) (Fig. 3); lateral surface of propodeum faintly imbricate with small, well defined punctures nearly contiguous on upper and anterior

Figs. 3–5. Photomicrographs of *Augochloropsis* (*Paraugochloropsis*) *isabelae*, new species. 3, Dorsal aspect of posterior mesosoma and anterior metasoma. 4, Facial aspect of female (macrocephalic) holotype and anterior dorsum of mesoscutum. 5, Facial aspect of female paratype. [images not to same scale]

borders, punctures gradually becoming more and more spaced posteriorly until separated by 2–4 times a puncture width; posterior surface of propodeum sculptured like that of posterior border of lateral surface. Metasoma with small, well defined punctures (Fig. 3) separated by 1–2 times a puncture width except medially on second through fourth metasomal terga punctures more closely spaced, integument between punctures varying from smooth to faintly imbricate, tergal posterior margins imbricate; sterna imbricate with well defined punctures separated by 0.5–1 times a puncture width, those basally more spaced than those medially or apically.

Head brilliant metallic green with golden and coppery highlights, a few weaker metallic blue highlights intermingled, except apical half of clypeus dark brown with metallic green and blue highlights, distal process of labrum brown, distal keel of labrum reddish brown, and basal area of labrum, mandible, labiomaxillary complex, and antennae dark brown. Mesosoma generally brilliant metallic green with blue highlights, particularly on propodeum; tegula brown except innermost margin and posterior angled portion metallic green; legs dark brown; wing veins dark brown, membrane hyaline. Metasomal terga brilliant metallic gold with strong metallic green highlights except fifth metasomal tergum dark brown, green most prominent on first metasomal tergum; sterna dark brown with strong metallic gold and green highlights.

Pubescence generally golden except somewhat fuscous on vertex, dorsum of mesosoma, and apical abdominal segments; first and second metasomal terga with apical fimbria composed of dense, short, stiff, golden setae, fimbrial setae longer on second metasomal tergum than those on first metasomal tergum (Fig. 3).

♂: Unknown.

Holotype: Female (macrocephalic), **Peru**: Rio Urubamba, 3k [km] above Machu Picchu 2050m, 18.iv.83 [18 April 1983], C. & M. Vardy, B.M. 1983-217; deposited in the Department of Entomology, Natural History Museum, London.

Paratype: Female, same data and repository as holotype.

Etymology: The specific epithet is a matronymic honoring my close colleague and friend, Dr. Isbael Alves dos Santos of the Universidade de São Paulo in Brazil. Dr. Alves dos Santos is one of the leading authorities on the biology and behavior of native Brazilian bees and their role in pollination.

ACKNOWLEDGMENTS

I am grateful to Dr. Isabel Alves dos Santos for years of fruitful collaboration and friendship, and to the Trustees of the Natural History Museum, London, for permitting the loan and study of the material discussed herein. This is a contribution of the Division of Entomology, University of Kansas Natural History Museum.

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